जननायक चन्द्रशेखर विश्वविद्यालय, बलिया-277001 (उ.प्र.)
Jananayak Chandrashekhar University, Ballia-277001 (U. P.)

JANANAYAK CHANDRASHEKHAR UNIVERSITY
BALLIA- 277001, U.P.

COURSE STRUCTURE FOR
M.Sc. (AGRICULTURE)
AGRICULTURAL ECONOMICS

Restructured and Revised Syllabi of Post-Graduate Programmes
(As per ICAR Recomendation 2021)

UNDER SEMESTER SYSTEM TO COME IN TO FORCE FROM

ACADEMIC SESSION – 2022-23

M.Sc. (Agriculture)
AGRICULTURAL ECONOMICS
Faculty of Agriculture

Dr. C Sandip kumar Pandey)
Member BOS

(I. Singh)
Dean

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Convener, B.O.S.

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M.Sc. (Agriculture)
Agricultural Economics
Common Academic Regulations for PG Programmes
As per Recommendation with *mutatis mutandis* ICAR Committee 2021
Restructured and Revised Syllabi of Post-graduate Programmes

Preamble

The large numbers of Indian peoples mainly depends on agricultural sector and plays an important role in development in Indian Economy. At present days   agricultural sector are changing at a very fast rate and this sector is integrated globally and thus it is facing global challenges. In the era of Information and Communication Technology, the knowledge which we gain becomes outdated within few years therefore it is important to reform/update our curriculum in line with the recent changes taking place. The major challenges faced by agricultural sector currently is related to demand to distribution/supply chain rather than production side. We are largest producer of food grain, horticultural, fisheries, products milk and livestock products even than we are the host of large no of poor people and mal nutrition people. Farmers' distress has become the major cause of concern for policy makers, on the other hand climate change is posing many challenges.
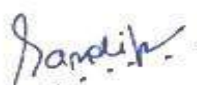
Agricultural Economics provides an advanced knowledge and technical skill will further elevate the agricultural sector to attain a new peak in increasing income of the farmers.
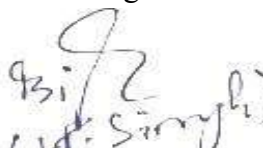
Present agriculture research and international market demand the need for specialized human resource for teaching cutting edge technology with application of farm management principles , agricultural marketing technique to storing food grain and increasing entrepreneurship, etc., would warrant students to have strong knowledge of practical and management skills which will help them to face the competitiveness in public and private sector.

Hence, restructuring of course curricula and delivery system to match with the present situation is the need of the time. In this proposed revision of curriculum in Agricultural Economics and thus organized a series of meetings and electronic media- led consultations to develop a set of courses suitable for M. Sc. discipline.

The meetings were focused on the basic principles as well as the innovative developments in Agricultural Economics as the platform building status of social Sciences. Built on this platform with the latest state of the art technologies including leaner programming techniques, international trade and farm management principle and will enable a complete coverage of the subjects. The basic courses have been kept as compulsory courses which need to be taken by all the students irrespective of the subject specialization or stream from which they entered into PG education.

The sub-committee on Agricultural Economics constituted by ICAR (under the ICAR Broad Subject Matter Area (BSMA) for Social Sciences) has kept all these challenges and development in view while revising the PG and PhD Curricula in Agricultural Economics. We reviewed the under-graduate, PG and Ph.D curricula. Moreover, student's prior knowledge is critical for learning any discipline and so we

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had to review and propose a new curriculum for Agricultural Economics at all levels. To do these, weidentified first the core competencies that are required at the different levels and worked backwards based on the areas and organising them into courses.
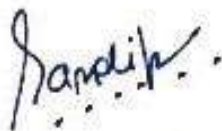
Many existing courses were upgraded with addition and deletion as per the need of the present situation. The new courses have been incorporated based on their importance and social need both at national and international level are Natural resource and environmental economics, computer application and agri-business, Rural and rural development Programmes for M.Sc.(Ag) programme.
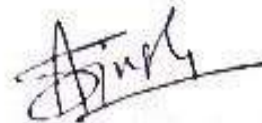
Common Academic Regulation

1. Academic Year and Registration
2. Credit requirements
2.1 Framework of the courses
2.2 Common Course
3. Supporting courses
2.4 Mandatory requirement of seminars
3. Duration of the programm
4. Evaluation of course work
4.1 Grading System
5. Advisory System
5.1 Advisory Committee
5.2 Approval of synopsis
6. Evaluation of research work
6.1 Prevention of plagiarism
7. Learning through online courses
8. Internship during Masters programme
9. Teaching assistantship
10. Inter-institutional Transfer of Credits
11. Compliance with the National Education Policy-2020
12. Definitions of academic terms
13. Course Title with Credit Load
14. Semester wise Allocation of Selected courses
15. Course contents

1. Academic Year and Registration

• An academic year shall be normally from July to June of the following calendar year otherwise required under special situations. It shall be divided into two academic terms known as semesters. Dates of registration, commencement of instructions, semester end examination, end of semester and academic year, etc. The Academic Calendar shall be developed by the concerned University from time to time and notified accordingly by the Registrar in advance.

• An orientation programme shall be organized by the Director (Education)/ Dean PGS for the benefit of the newly admitted students immediately after commencement of the semester.

• On successful completion of a semester, the continuing students shall register for subsequent semester on the date specified in the Academic/ Semester Calendar or specifically notified separately. Every enrolled student shall be required to register at the beginning of each semester till the completion of his/ her degree programmes.

2. Credit requirements
2.1 Framework of the courses
The following nomenclature and Credit Hours need to be followed while providing the syllabus for M.Sc.(Ag.) Agricultural Economics:

Minimum Credit Rerquired

(i) Course work

Major courses	20
Minor courses	08
Supporting courses	06
Common courses	05
Seminar	01
(ii) Master,s Research	30
Total	**70**

Maximum permissible course workload as per semester Master's Programme-18 credits

Major courses: From the discipline in which a student takes admission. Among the listed courses, the core courses compulsorily to be taken may be given mark

Minor courses: From the subjects closely related to a student's major subject

Supporting courses: The subject not related to the major subject. It could be any subject considered relevant for student's research work (such as Statistical Methods, Design of Experiments, etc.) or necessary for building his/ her overall competence.

2.2Common Courses: The following courses (one credit each) will be offered to all students undergoing Master's degree programme:

Comn.501 Technical Writing and Communications Skills 1 (0+1)

Comn.502 Intellectual Property and its management in Agriculture 2 (2+0)

Comn.503 Agricultural Research, Research Ethics and Rural Development Programmes 2 (2+0)

  Some of these courses are already in the form of e-courses/ MOOCs. The students may be allowed to register these courses/ similar courses on these aspects, if available online on SWAYAM or any other platform. If a student has already completed any of these courses during UG, he/ she may be permitted to register for other related courses with the prior approval of the Head of Department (HOD)/ Board of Studies (BOS).

2.3 Supporting Courses- The following courses are being offered by various disciplines (The list is only indicative). Based on the requirement, any of the following courses may be opted under the supporting courses. The syllabi of these courses are available in the respective disciplines. If required, the contents may be modified to suit the individual discipline with approval of the BoS:

2.4 Mandatory requirement of seminars

- It has been agreed to have mandatory seminars one in Masters (One Credit)
- The students should be encouraged to make presentations on the latest developments and literature in the area of research topic. This will provide training to the students on preparation for seminar, organizing the work, critical analysis of data and presentation skills.
- The evaluation of seminar presentation shall be done by the departmental committee which shall be constituted by the Head of Department /Principal of College
- Result should be satisfactory.

3. Duration of the Programme

Minimum -4 semesters (2 academic years)

Maximum -8 semesters

4. Evaluation of course work

For M.Sc.(Ag.) multiple levels of evaluation (**Midterm and Final semester**) is desirable. However, it has been felt that the comprehensive examination is redundant for M.Sc. students. Each paper have maximum marks-100.

Mid term- 25 marks

Practical - 25 marks

Final semester- 50 marks

4.1. Grading System

Scale: 10 point

i. Minimum passing grade in a course 5.00

ii. Minimum OGPA to continue and to obtain degree: 5.50

Attendance requirements

Minimum 75%, to be counted separately for theory and practical Course evaluation

5. Advisory System

5. 1 Advisory Committee

- Minimum 3 members (2 from major subject including Chairman, and one from minor subject) to be constituted within three months of the 1st Semester

- Theory – Internal/External
- Practical – Internal, to be conducted by the course teacher + one external examiner for all paper in each semester to be nominated by the University.

i. Thesis Evaluation:	External (One examiner)
ii. Thesis Viva-Voce:	By Advisory Committee and External (One examiner)
iii. Assessment:	Satisfactory/Unsatisfactory

•The Advisor should convene a meeting of the Advisory Committee at least once in a Semester. The summary record should be communicated to the Head of Department, Dean of the College of concerned, Dean PGS and Registrar for information.

Advisor/ Co-guide/ Member, Advisory Committee from other collaborating University/ Institute/ Organization

• In order to promote quality Post-graduate research and training in cutting edge areas, the University may enter into Memorandum of Understanding (MOU) with other Universities/ Institutions for conducting research. While constituting an Advisory Committee of a student, if the Chairperson, Advisory Committee feels the requirement of involving of a faculty member/ scientist of such partnering university/ Institute/ Organization, he/ she may send a proposal to this effect to Director (Education)/ Dean PGS along with the proposal for consideration of Student's Advisory Committee (SAC).

• The proposed faculty member from the partnering institution can be allowed to act as Chairperson/ Co-guide/ Member, SAC, by mutual consent, primarily on the basis of intellectual input and time devoted for carrying out the research work at the particular institution. The faculty member/ scientist of partnering institutions in the SAC shall become a temporary faculty member of the University by following the procedure approved by the Academic Council.

Allotment of students to the retiring persons

Normally, retiring person may not be allotted M. Sc.(Ag.) Student if he/ she is left with less than 2 years of service and Ph.D. student if left with less than 3 years of service. However, in special circumstances, permission may be obtained from the Director (Education)/ Dean PGS, after due recommendation by the concerned Head of the Department.

Changes in the Advisory Committee:

(i) Change of the Chairperson or any member of the Advisory Committee is not ordinarily permissible. However, in exceptional cases, the change may be effected with due approval of the Director of Education/ Dean PGS.

(ii) Normally, staff members of the university on extra ordinary leave or on study leave or who leave the University service will cease to continue to serve as advisors of the Post-graduate students of the University. However, the Director (Education)/ Dean PGS may permit them to continue to serve as advisor subject to the following conditions:

(a) The concerned staff member must be resident in India and if he/ she agrees to guide research and must be available for occasional consultations;

(b) An application is made by the student concerned duly supported by the Advisory Committee;

(c) The Head of the Department and the Dean of the College concerned agree to the proposal;

(d) The staff member, after leaving the University service is granted the status of honorary faculty's membership by the Vice-Chancellor on the recommendation of the Director (Education)/ Dean PGS for guiding as Chairperson or Member, Advisory Committee the thesis/ theses of the student(s) concerned only.

(iii) In case the Chairperson/ member of a Student's Advisory Committee retires, he/ she shall be allowed to continue provided that the student has completed his course work and minimum of 10 research credits and the retiring Chairperson/ member stays at the Headquarters of the College, till the thesis is submitted.

(iv) If the Chairperson/ member proceeds on deputation to another organization, he/ she may be permitted to guide the student provided his/ her new organization is at the Headquarters of the College and his/ her organization is willing for the same.

(v) The change shall be communicated to all concerned by the Head of Department.

5.2 Approval of synopsis: Should be accomplished by Advisory Committee

6. Evaluation of research work

- It is highly desirable for M.Sc.(Ag.) programme and this should be done external and internal examiner
- The research work may be initiated in any of I to IV^{rth} semester but the thesis shall be submitted at the end of IV semester.
- The viva voce will be conducted for evaluation research work for PG after submission of thesis by external examiner
- The result should be satisfactory

6.1 Prevention of plagiarism
• An institutional mechanism should be in place to check the plagiarism. The students must be made aware that manipulation of the data/ plagiarism is punishable with serious consequences.
7. Learning through online courses
• In line with the suggestion in new education policy and the initiatives taken by ICAR and MHRD in the form of e-courses, MOOCs, SWAYAM, etc. and also changes taking place globally in respect of learning through online resources it has been agreed to permit the students to enroll for online courses. It is expected that the provision of integrating available online courses with the traditional system of education would provide the students opportunities to improve their employability by imbibing the additional skills and competitive edge.
The Committee recommends the following points while integrating the online courses:

1. Board of Studies (BoS) of each Faculty shall identify available online courses and a student may select from the listed courses. The interested students may provide the details of the on-line courses to the BoS for its consideration.

2. A Postgraduate student may take up to a maximum of 20% credits in a semester through online learning resources.

3. The host institute offering the course does the evaluation and provide marks/ grades. The BoS shall develop the conversion formula for calculation of GPA and it may do appropriate checks on delivery methods and do additional evaluations, if needed.

8. <u>Internship during Masters programme</u>

Internship for Development of Entrepreneurship in Agriculture (IDEA) Currently, a provision of 30 credits for dissertation work in M.Sc.(Ag). programmes helps practically only those students who aspire to pursue their career in academic/ research. There is hardly any opportunity/ provision under this system to enhance the entrepreneurship skills of those students who could start their own enterprise or have adequate skills to join the industry. Therefore, in order to overcome this gap, an optional internship/ in-plant training (called as IDEA) in **lieu** of thesis/ research work is recommended which will give the students an opportunity to have a real-time hands-on experience in the industry.
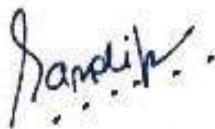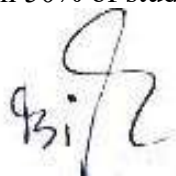
It is envisaged that the internship/ in-plant training would enhance the interactions between academic organizations and the relevant industry. It would not only enable the development of highly learned and skilled manpower to start their-own enterprises but also the industry would also be benefitted through this process. This pragmatic approach would definitely result in enhanced partnerships between academia and industry.

<u>The main objectives of the programme</u>:

1. To promote the linkages between academia and industry

2. To establish newer University – Cooperative R&D together with industry for knowledge creation, research and commercialization
 3. Collaboration between Universities and industries through pilot projects
 4. To develop methods for knowledge transfer, innovation and networking potential
5. To enhance skill, career development and employability
Following criteria for IDEA will be taken into consideration:
• At any point of time there will not be more than 50% of students who can opt under IDEA

- Major Advisor will be from Academia and Co-advisor (or Advisory Committee member) from industry

• Total credits (30) will be divided into 20 for internship/ in-plant training and10 for writing the report followed by viva-voce similar to dissertation

• Work place will be industry; however, academic/ research support would be provided by the University or both. MoU may be developed accordingly
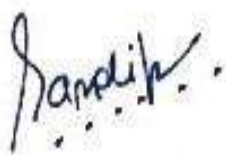• The IPR, if any, would be as per the University policy

9. Teaching assistantship
• Teaching assistantship shall be encouraged. This will give the required experience to the students on how to conduct courses, practical classes, evaluation and other related academic matters.

10.Inter-institutional Transfer of Credits
Once the unified national PG curriculum and common academic regulations get implemented, the students may be permitted to transfer credits from one institution to another in case of unavoidable migration. Migration of students admitted through ICAR quota should not be allowed. The migration rules may be framed by the individual SAUs, and due care need be exercised to avoid inbreeding in students.

11. Compliance with the National Education Policy-2020
• While implementing the course structure and contents recommended by the BSMA Committees, the Higher Education Institutions (HEIs) are required to comply with the provisions of National Education Policy-2020, especially the following aspects:
• Given the 21st century requirements, quality higher education must aim to develop good, thoughtful, well-rounded, and creative individuals. It must enable an individual to study one or more specialized areas of interest at a deep level, and also develop character, ethical and Constitutional values, intellectual curiosity, scientific temper, creativity, spirit of service, and 21st century capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects. A quality higher education must enable personal accomplishment and enlightenment, constructive public engagement, and productive contribution to the society. It must prepare students for more meaningful and satisfying lives and work roles and enable economic independence (9.1.1. of NEP-2020).

• At the societal level, higher education must enable the development of an enlightened, socially conscious, knowledgeable, and skilled nation that can find and implement robust solutions to its own problems. Higher education must form the basis for knowledge creation and innovation thereby contributing to a growing national economy. The purpose of quality higher education is, therefore, more than the creation of greater opportunities for individual employment. It represents the key to more vibrant, socially engaged, cooperative communities and a happier, cohesive, cultured, productive, innovative, progressive, and prosperous nation (9.1.3. of NEP-2020).

• Flexibility in curriculum and novel and engaging course options will be on offer to students, in addition to rigorous specialization in a subject or subjects. This will be encouraged by increased faculty and institutional autonomy in setting curricula. Pedagogy will have an increased emphasis on communication, discussion, debate, research, and opportunities for cross-disciplinary and interdisciplinary thinking (11.6 of NEP-2020).

- As part of a holistic education, students at all HEIs will be provided with opportunities for internships with local industry, businesses, artists, crafts persons, etc., as well as research internships with faculty and researchers at their own or other HEIs/ research institutions, so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability (11.8 of NEP-2020).

• HEIs will focus on research and innovation by setting up start-up incubation centres; technology development centers; centers in frontier areas of research; greater industry-academic linkages; and interdisciplinary research including humanities and social sciences research (11.12. of NEP-2020).

• Effective learning requires a comprehensive approach that involves appropriate curriculum, engaging pedagogy, continuous formative assessment, and adequate student support. The curriculum must be interesting and relevant, and updated regularly to align with the latest knowledge requirements and to meet specified learning outcomes. High-quality pedagogy is then necessary to successfully impart the curricular material to students; pedagogical practices determine the learning experiences that are provided to students, thus directly influencing learning outcomes. The assessment methods must be scientific, designed to continuously improve learning and test the application of knowledge. Last but not least, the development of capacities that promote student wellness such as fitness, good health, psycho-social well-being, and sound ethical grounding are also critical for high-quality learning (12.1. of NEP-2020).

12. Definitions of Academic Terms

Chairperson means a teacher of the major discipline proposed by the Head of Department through the Dean of the College and duly approved by the Director of Education/ Dean Post Graduate Studies (or as per the procedure laid down in the concerned University regulations) to act as the Chairperson of the Advisory Committee and also to guide the student on academic issues.

Course means a unit of instruction in a discipline carrying a specific number and credits to be covered in a semester as laid down in detail in the syllabus of a degree programme.

Credit means the unit of work load per week for a particular course in theory and/ or practical. One credit of theory means one class of one clock hour duration and one credit practical means one class of minimum two clock hoursof laboratory work per week.

Credit load of a student refers to the total number of credits of all the courses he/ she registers during a particular semester. Grade Point (GP) of a course is a measure of performance. It is obtained by dividing the per cent mark secured by a student in a particular course by 10, expressed and rounded off to second decimal place.
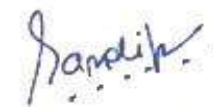
Credit Point (CP) refers to the Grade point multiplied by the number of credits of the course, expressed and rounded off to second decimal place.
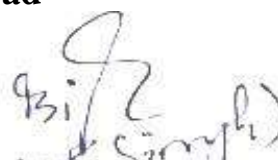
Grade Point Average (GPA) means the total credit point earned by a student divided by total number of credits of all the courses registered in a semester, expressed and rounded off to second decimal place.
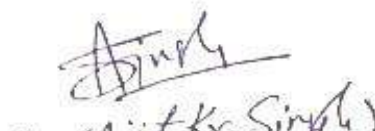
Cumulative Grade Point Average (CGPA) means the total credit points earned by a student divided by the total number of credits registered by the student until the end of a semester (all completed semesters), expressed and rounded off to second decimal place.

Overall Grade Point Average (OGPA) means the total credit points earned by a student in the entire degree programme divided by the total number of credits required for the P.G. degree, expressed and rounded off to second decimal place.

13.Course Code, Title with Credit Load

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Courses at a Glance

M.Sc.(Ag) Agricultural Economics

Sr. No.	Course Code	Title of Course	Credits (Th.+Pr.)
MAJOR COURSE/ CORE COURSES			**20**
1	AEC-501	Micro Economic Theory And Applications	3 (3+0)
2	AEC-502	Agricultural Production Economics	2 (1+1)
3	AEC-503	Agricultural marketing And Price Analysis	3 (2+1)
4	AEC-504	Macro Economics And Policy	2 (2+0)
5	AEC-505	Econometrics s	3 (2+1)
6	AEC-507	Agricultural Finance And Project Management	3 (2+1)
7	AEC-508	Linear Programming	2 (1+1)
8	AEC-509	Research Methodology for Social Science	2 (1+1)
MINOR COURSE			**8**
9	AEC-510	Indian Economy: History And Contemporary Issues	2 (2+0)
10	AEC-511	International Economics	2 (1+1)
11	AEC-513	Natural Resource And Environmental Economics	2 (1+1)
12	AEC-516	Rural Marketing	2 (2+0)
SUPPORTING COURSES			**6**
13	STAT-501	Statistical Methods For Applied /Social Sciences	3 (2+1)
14	COMP	Computer Applications For Agri-Business & Economics	3 (2+1)
COMMON COURSE			**5**
15	COMN-501	Technical Writing And Communication Skill	1 (0+1)
16	COMN-502	Intellectual Property And Its Management In Agriculture	2 (2+0)
17	COMN-503	Agricultural Research, Research Ethics and Rural Development Programmes	2 (2+0)
Seminar			
18	AECMS	Master Seminar	1 (0+1)
Thesis			
19	AECMR	Master Research (Thesis)	30

Total Credits	**70**

(Major- course 20 credits 8 paper,   Minor- 8 credits 3 paper,   Supporting- 6 credit 2 paper , Common- 5 credit 3 paper,   Seminar- 1 credit, Thesis- 30 credit)

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14. Semester wise Allocation course programs

1st semester

Major	Course code	Course Title	Credit (Th+Pr)
1	AEC-501	Micro Economic Theory And Applications	3 (3+0)
2	AEC-502	Agricultural Production Economics	2 (1+1)
3	AEC-503	Agricultural marketing And Price Analysis	3 (2+1)
Minor			
4	AEC-510	Indian Economy: History And Contemporary Issues	2 (2+0)
Supporting			
5	STAT-501	Statistical Methods For Applied /Social Sciences	3 (2+1)
Common course			
6	COMN-501	Technical Writing And Communication Skill	1(0+1)

2nd Semester

Major			
1	AEC-504	Macro Economics And Policy	2 (2+0)
2	AEC-505	Econometrics	3 (2+1)
Minor			
3	AEC-511	International Economics	2 (1+1)
Supporting			
4	COMP-	Computer Applications For Agri-Business & Economics	3 (2+1)
Common course			
5	COMN-502	Intellectual Property And Its Management In Agriculture	2 (2+0)

3rd Semester

Major			
1	AEC-507	Agricultural Finance And Project Management	3 (2+1)
2	AEC-508	Linear Programming	2 (1+1)
Minor			
3	AEC-513	Natural Resource And Environmental Economics	2 (2+0)
4	AEC-516	Rural Marketing	2 (2+0)
Common			
5	COMN-503	Agricultural Research, Research Ethics and Rural Development Programmes	2 (2+0)

4th Semester

Major			
1	AEC-509	Research Methodology for Social Science	2 (1+1)
Seminar			
2	AECMS	Master Seminar	1 (0+1)
Thesis			
3	AECMR	Master Research (Thesis)	30

Grand Total Credit-70

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Paper wise Allocation course credit & Maximum Marks M.Sc.(Ag) Agricultural Economics

Sr. No.	Paper Code	Course Title / Paper Title	Credit (Th.+Pr.)	Maximum Marks			Total Marks
				M.T	E.T.	Pr./Ass	
		1st Semester					
1	AEC-501	Micro Economic Theory And Applications	3 (3+0)	25	50	25	100
2	AEC-502	Agricultural Production Economics	2 (1+1)	25	50	25	100
3	AEC-503	Agricultural marketing And Price Analysis	3 (2+1)	25	50	25	100
4	AEC-510	Indian Economy: History And Contemporary Issues	2 (2+0)	25	50	25	100
5	STAT-501	Statistical Methods For Applied /Social Sciences	3 (2+1)	25	50	25	100
6	COMN-501	Technical Writing And Communication Skill	1 (0+1)	--	--	100	100
Sr.No. 1,2,3- Major, 4-Minor, 5-Supporting & 6-Common Course			**14**				600
		2nd Semester					
1	AEC-504	Macro Economics And Policy	2 (2+0)	25	50	25	100
2	AEC-505	Econometrics	3 (2+1)	25	50	25	100
3	AEC-511	International Economics	2 (1+1)	25	50	25	100
4	COMP-	Computer Applications For Agri-Business & Economics	3 (2+1)	25	50	25	100
5	COMN-502	Intellectual Property And Its Management In Agriculture	2 (2+0)	25	50	25	100
Sr.No. 1,2- Major, 3-Minor, 4-Supporting & 5-Common Course			**12**				500
		3rd Semester					
1	AEC-507	Agricultural Finance And Project Management	3 (2+1)	25	50	25	100
2	AEC-508	Linear Programming	2 (1+1)	25	50	25	100
3	AEC-513	Natural Resource And Environmental Economics	2 (2+0)	25	50	25	100
4	AEC-516	Rural Marketing	2 (2+0)	25	50	25	100
5	COMN-503	Agricultural Research, Research Ethics and Rural Development Programmes	2 (2+0)	25	50	25	100
Sr.No. 1,2- Major, 3,4-Minor & 5-Common Course			**11**				500
		4th Semester					
1	AEC-509	Research Methodology for Social Science	2 (1+1)	25	50	25	100
2	AECMS	Master Seminar	1 (0+1)	--	--	100	100
3	AECMR	Master Research (Thesis)	30	Satisfactory/Unsatisfactory			
Sr.No. 1- Major Course, 2-Master Seminar & 3-Master Research			**33**				200
NOTE: M.T. = Mid Term, E.T.= End Tem, Pr./Ass.= Practical/Assignment+Viva-Voce. **(Grand Total Credit-70)**							

15.   Major Course (Course contents)

M.Sc. (Ag.) Agricultural Economics

AEC-501 : MICRO ECONOMIC THEORY AND APPLICATIONS   (3+0)

Why this course:

Markets form an integral part of the economy. They are governed by demand and supply mechanism with profit making its ultimate goal. Thus, it is imperative to expose the students towards how the markets function, their types and how the buyers and sellers behave. That will help them make correct decision when it comes to price setting and choice of product.

Objective of the Course:

The course envisages the concepts and principles embodying micro-economics. The economic problems, functioning of price mechanism, theory of household behaviour and consumer's demand function. Theory of firm, supply determinants, determination of price under different market structures and factor pricing (micro economic components).

Theory

Unit I: Basic Concepts: A review

Scarcity and Choice; Production possibility frontier, Positive and normative economics; concepts of opportunity cost, Demand and Supply: determinants of individual demand/supply; demand/supply schedule and demand/supply curve; market versus individual demand/supply; shifts in the demand/supply curve.

Unit II: Consumer Choice

Cardinal Utility Approach - Ordinal Utility Approach -Budget sets and Preferences under different situations – Hicks and Slutsky income and substitution effects – Applications of Indifference curve approach - Revealed Preference Hypothesis – Consumer surplus -Derivation of Demand curve – Elasticity of demand- Demand and supply together; how prices allocate resources; controls on prices- price floor and price ceiling – applications in agriculture.

Unit III: Production and Cost

Production functions: single variable - average and marginal product, variable proportions, stages of production. Two variables - isoquants, returns to scale and to a factor; factor prices; Technical progress; cost minimization and output maximization; Elasticity of substitution. Expansion path and the cost function Concept of economic cost; Short run and long run cost curves; increasing and decreasing cost industries; envelope curve; L-shaped cost curves; economies of scale; revenue and expenditure, elasticity and marginal revenue; Firm equilibrium and profit.

Unit IV: Factor Markets

Labour and land markets - basic concepts (derived demand, productivity of an input, marginal productivity of labour, marginal revenue product); demand for labour; input demand curves; shifts in input demand curves; competitive labour markets; Economic rent and quasi rent .

Teaching Methods/ Activities

- Lectures
- Case studies
- Assignments (Group/individual)
- Group Discussions on practises done by firms.
- Power point presentations by students.
- Exploring the agricultural market and identification of industries and their type.

Suggested Readings:
* *Modern Micro Economics by A. Koutsoyiannis, Published by MACMILLAN PRESS LTD*
* *Micro Economic Theory by Ferguson and Gould by Richard D Erwin INC USA*
* *Richard A. Bilas, Micro Economic Theory.*
* *Leftwich Richard H., The Price System and Resources Allocation*
* *Allen, C.L., A Frame Work of Price Theory*
* *Modern Agricultural Economics(in Hindi), Rama Publishing House.*

AEC 502 : AGRICULTURAL PRODUCTION ECONOMICS   2 (1+1)

Why this course:

Production in agriculture is the outcome of the input factors involved. In this competitive and uncertain market, it is important that the farmers take the right decision about the combination of inputs that will result in higher income. Thus, as an economist it is a pre-requisite that the students understand the interaction between output and input. And work out the most effective production plan.

Objectives of the course:

To expose the students to develop the concept, significance and uses of production economics. To understand the relationships between factors and output. To learn how to decide the combination of inputs to be used as per the resources available. Ensure that the production process works efficiently.

Theory

Unit I: Concepts of production economics

Nature, scope and significance of agricultural production economics- Agricultural Production processes, character and dimensions-spatial, temporal - Centrality of production functions, assumptions of production functions, commonly used forms - Properties, limitations, specification, estimation and interpretation of commonly used production functions.

Unit II: Factors and theory of production

Factors of production, classification, interdependence, and factor substitution Determination of optimal levels of production and factor application -Optimal factor combination and least cost combination of production - Theory of product choice; selection of optimal product combination.
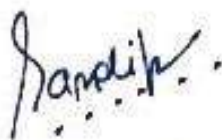
Unit III: Concepts of cost

Cost functions and cost curves, components, and cost minimization -Duality theory – cost and production functions and its applications -Derivation of firm's input demand and output supply functions -Economies and diseconomies of scale.

Unit IV: Dynamics of economic assessment

Technology in agricultural production, nature and effects and measurement - Measuring efficiency in agricultural production; technical, allocative and economic efficiencies - Yield gap analysis-concepts- types and measurement.

Practical

Different forms of production functions -specification, estimation and interpretation of production functions – returns to scale, factor shares, elasticity of production - physical optima-economic optima-least cost combination- optimal product choice- cost function estimation, interpretation-estimation of yield gap - incorporation of technology in production functions- measuring returns to scale-risk analysis.

Teaching Methods/ Activities
- Lectures.
- Assignments (Group/individual).
- Group Discussions on working out.
- Power point presentations by students.
- Exploring the agricultural market and identification of industries and their type.

Suggested Readings:

- *E. O. Heady, Economics of Agricultural Production and resources use.*
- *John P. Doll and Frank Orazem, Production Economics: Theory with application*
- *Heady E.O. & Dillon, J L. 1961. Agricultural Production functions. Kalyani Publishers, Ludhiana, India.667p.*
- *Baumol, W.G. 1973. Economic theory and operations analysis. Practice Hall of India Private Limited, New Dehli.626 p.*
- *Gardner BL & Rausser GC. 2001. Handbook of Agricultural Economics Vol. I Agricultural Production. Elsevier.*
- *Modern Agricultural Economics(in Hindi), Rama Publishing House.*

AEC 503: Agricultural Marketing and Price Analysis   3 (2+1)

Why this course:

The ultimate aim of production process is to sell the produce in the market and generate income. Markets serves as platform where this exchange takes place. Agriculture markets are different from other markets due to the nature of the commodity. Thus, it is important to develop a strong foundation of agricultural marketing, its components and issues. The student needs to know about the multi-pronged ways of marketing the produce, agencies involved. In this modern era, it is important to understand how technology is transforming this sector.

Objective of the Course:

The course is designed to acquaint the students about the basics of dynamics of agricultural marketing. The content includes supply, demand and marketing of farm production, marketing functions and channels, marketing costs, margins and efficiency, agricultural prices, New marketing formats like e-marketing, e-NAM future trading, supply chain management, market intelligence etc.

Theory

Unit I: Introduction to agricultural marketing

New Concepts in Agricultural Marketing - Characteristic of Agricultural product and Production – Problems in Agricultural Marketing from Demand and Supply and Institutions sides. Market intermediaries and their role - Need for regulation in the present context - Marketable & Marketed surplus estimation. Marketing Efficiency.

Unit II: Aspects of agricultural marketing

Different Forms of marketing: Co-operatives Marketing – APMC Regulated Marketing - Direct marketing, Farmer Producer Companies, e-NAM and marketing under e-NAM, e-marketing Contract farming and Retailing, Organized retailing - Supply Chain Management - State trading, Warehousing and other Government agencies -Performance and Strategies -Market infrastructure needs, performance and Government role - Value Chain Finance.

Unit III: Future marketing and government

Introduction to Commodities markets and future trading - Basics of commodity futures - Operation Mechanism of Commodity markets – Price discovery - Hedging and Basis - Fundamental analysis - Technical Analysis - Role of Government/SEBI in promoting commodity trading and regulatory measures.

Unit IV: Use of Information Technology and Dynamics of price
Role of Information Technology and Market Intelligence in marketing of agricultural commodities, - electronic auctions (e-bay), e-Chaupals, Agmarknet and Domestic and Export market Intelligence Cell (DEMIC). Price forecasting Price policy and economic development – non-price instruments.

Practical
Supply and demand elasticities in relation to problems in agricultural marketing. Price spread and marketing efficiency analysis. Marketing structure analysis through concentration ratios. Performance analysis of Regulated market and marketing societies. Analysis on contract farming and supply chain management of different agricultural commodities, milk and poultry products. Supply Chain Analysis - quantitative estimation of supply chain efficiency - Market Intelligence – Characters, Accessibility, and Availability Price forecasting. Online searches for market information sources and interpretation of market intelligence reports – commodity outlook - Technical Analysis for important agricultural commodities.

Teaching Methods/ Activities
- Lectures.
- Case studies.
- Assignments (Group/individual).
- Group Discussions on price volatility and control measures prevailing.
- Power point presentations by students on government schemes.
- Visit to eNAM mandies, Warehouses etc.

Suggested Readings:
- *Acharya, S. S. & Agarawal, N.L.2004. Agricultural Marketing in India. Oxford and IBH Publishing company Pvt. Ltd. New Delhi.*
- *Acharya, S. S. & Agarawal, N. L. 1994. Agricultural Prices-Analysis and Policy. Oxford and IBH Publishing company Pvt. Ltd. New Delhi.*
- *Richard H Kohls and Joseph N. Uhl: Marketing of Agricultural products by Collier MacMillan International*
- *New Agricultural Economics(in Hindi), Rama Publishing House*

AEC-504 : MACRO ECONOMICS AND POLICY   2 (2 +0)

Why this course:
The economy of the nation is governed by certain rules, regulation and principles. The students has to gain knowledge of the mechanism through which the large economies are controlled and ensure that welfare prevails. They are entitled to know the transactions between different markets and policies framed to keep value of money under control.
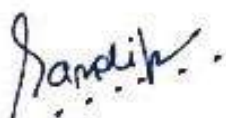
Objective of the Course:
The course envisages the concepts and principles of macroeconomics from classical to Keynesian theories. The other component deals with the monetary system-money, credit and banking system, value of money and economic activities, national income accounting and approaches to estimate national income theory of income and employment determination and inflation.

Theory
Unit I: INTRODUCTION: MEASUREMENT AND CONCEPTS
Basic concepts and scope of Macro-economics, National Income Accounting: Methods of measurement of key macro-economic aggregates, relationship of national income and other aggregates, real and nominal income

Unit II: CLASSICAL MACRO ECONOMICS
Say's Law, Quantity Theory of Money, aggregate labour supply and demand of labour, Classical theory of determining output, wages and prices.

Unit III: INCOME AND SPENDING: KEYNESIAN FRAMEWORK
Simple Keynesian model of income determination; Keynesian Multiplier- aggregate spending, taxation, transfer payments, foreign spending, balanced budget; budget surplus (with numerical exercises).

Unit IV: MONEY, INTEREST AND INCOME
Goods market equilibrium-IS curve; Demand for Money, the Liquidity Preference Theory - Liquidity Trap; asset market equilibrium- LM curve; simultaneous equilibrium in goods and asset market- effect of fiscal and monetary policy, Inflation: Nature, Effects and control; Types of inflation.

Teaching Methods/ Activities
- Lectures.
- Case studies.
- Assignments (Group/individual).
- Group Discussions on inflation.

Suggested Readings:
- *Stonier & Hegue, A Text Book of Economic Theory*
- *Samuelson, P. A.1948. Foundation of Economic Analysis. Harvard University Press*
- *M. C. Vaish, Allid, New Delhi, 1983Macro–Economics Theory*
- *Gardner Ackley, Macmillan, New York, 1961Macro–Economics Theory:*
- *T. F. Dernburg & D. M. Mcdougali-Macro Economics*
- *G. Sirkin – Introduction to Macro–Economics Theory*
- *R.L. Heibroker-Understanding Macro–Economics*
- *J.K Mehta –Macro Economics*
- *New Agricultural Economics(in Hindi), Rama Publishing House*

AEC- 505: ECONOMETRICS   3 (2+1)

Why this course:
Development of analytical skills is imperative to make students proficient in conducting quality research work. The knowledge of variables, their models, and problems encountered when dealing with variables will build up a compatibility with the analytical aspects.
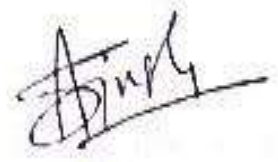
Objective of the Course:
The course provides knowledge of the econometric methods like time series analysis, linear regression models and their application in economic analysis. The course provides an insight into the econometric problems in analyzing time series and cross section data.

Theory

Unit I: Introduction
Relationship between economic theory, mathematical economics, models and econometrics, methodology of econometrics-regression analysis.

Unit II: Classical Linear Regression

Basic two variable regression – assumptions estimation and interpretation approaches to estimation – OLS and their properties – extensions to multi-variable models-multiple regression estimation and interpretation.

Unit III: Breaking down of Classical assumptions

Violation of assumptions – identification, consequences and remedies for Multicollinearity, heteroscedasticity, autocorrelation – data problems and remedial approaches – model misspecification.

Unit IV: Qualitative variables and simultaneous equation models

Use of dummy variables- Introduction to simultaneous equations- identification problem

Practical

Single equation two variable model specification and estimation – hypothesis testing transformations of functional forms and OLS application-estimation of multiple regression model – hypothesis testing – testing and correcting specification errors – testing and managing Multicollinearity –estimation of regressions with dummy variables

Teaching Methods/ Activities

- Lectures.
- Assignments (Group/individual).

Suggested Readings;

- *Dorfman R. 1996. Linear Programming and Economic Analysis. McGraw Hill.*
- *Greene, W.H. 2002. Econometric Analysis. Pearson Education.*
- *Johnston, J. and Dinardo, J. 2000. Econometric Methods. Mc Graw-Hill.*
- *Koutseyianis, A. 1997. Theory of Econometrics. Barner & Noble.*
- *Maddala, G.S. 2002. Econometrics. Mc Graw-Hill.*
- *Pinndyck, R.S. and Rubinfeld, D.L. 1990. Econometric Models and Econometric Forecasts. Mc Graw Hill.*

AEC- 507: Agricultural Finance and Project Management 3 (2+1)

Why this course:

Money is the fuel of driving all the economic activities. India is a land of small and marginal farmers. The financial conditions of the farmers is not so strong that they can finance themselves. They require credit to meet the requirements of inputs. Thus, the student should know the sources, principles involved and types of credit available..

Objective of Course:

This course is designed with an objective to deliver knowledge of the principles, procedures, problems and policies relating to financing agricultural firms. In addition to this the students are also given knowledge about the research developments in the subject. The approach is analytic.

Theory

Unit I: Basic concepts: A Review

Role and Importance of Agricultural Finance. Financial Institutions and credit flow to rural/priority sector. Agricultural lending – Direct and Indirect Financing - Financing through Co-operatives, NABARD and Commercial Banks and RRBs. District Credit Plan and lending to agriculture/priority sector. Micro-Financing and Role of MFI's - NGO's, and SHG's.

Unit II: Credit a nd its aspects

Lending to farmers – The concept of 3 C's, 7 P's and 3 R's of credit. Estimation of Technical feasibility, Economic viability and repaying capacity of borrowers and appraisal of credit proposals. Understanding lenders and developing better working relationship and supervisory credit system.

Unit III: Financial analysis and Project Overview

Financial Decisions – Investment, Financing, Liquidity and Solvency. Preparation of financial statements - Balance Sheet, Cash Flow Statement and Profit and Loss Account. Project Approach in financing agriculture. Financial, economic and environmental appraisal of investment projects. Identification, preparation, appraisal, financing and implementation of projects. Agreements, supervision, monitoring and evaluation phases in appraising agricultural investment projects. Net work Techniques – PERT and CPM.

Unit IV: Risk and its Management

Risks in financing agriculture. Risk management strategies and coping mechanism. Crop Insurance programmes – review of different crop insurance schemes - yield loss and weather based insurance and their applications.

Practical

Development of Rural Institutional Lending - Branch expansion, demand and supply of institutional agricultural credit and Over dues and Loan waiving- : An overview, Rural Lending Programmes of Commercial Banks, Lead Bank Scheme- Preparation of District Credit Plan, Rural Lending Programmes of Co-operative Lending Institutions, Preparation of financial statements using farm/firm level data, Farm credit appraisal techniques and farm financial analysis through financial statements, Performance of Micro Financing Institutions - NGO's and Self-Help Groups, Identification and formulation of investment projects, Project appraisal techniques – Discounted Measures, Network techniques – PERT and CPM for project management, Case Study Analysis of an Agricultural project, Financial Risk and risk management strategies – crop insurance schemes, Financial instruments and methods – E banking, Kisan Cards and core banking.

Teaching Methods/ Activities
- Lectures.
- Case studies.
- Assignments (Group/individual).
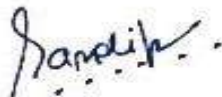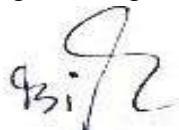- Group Discussions on inflation

Suggested Readings:
- *Die Sollem, H. and Heady, E. O. (Ed.). Capital and Credit Needs in Changing Agriculture, Bauman*
- *Hopkins, A. Barry, Peter Jo, and Baker, C.B., Financial Management in Agriculture,*
- *William G. Murray and Aaron G. Nelson, Iowa State University 1960Agricultural Finance*
- *Agricultural Finance in India: Role of Commercial Banks, Charnjit Chanona, Marketing and Economics Research Bureau, New Delhi, 1969.*
- *Gittinger, J. P. 1972, Economic analysis of agricultural projects, John Hopkins Univ. Press, Baltimore.*
- *Little, I.M.D. and J.A. Mirrless 1974, Project appraisal and planning for developing countries, Oxford and IBH publishing Co. New Delhi..*
- *Harberger, Arnold C 1972, Project Evaluation, collected papers, Macmillan.*
- *New Agricultural Economics(in Hindi), Rama Publishing House*

AEC- 508: Linear Programming   2 (1+1)

Objective of Course:

The course is to impart knowledge of linear programming techniques

Theory
Unit I:
Decision Making- Concepts of decision making, introduction to quantitative tools, introduction to linear programming, uses of LP in different fields, graphic solution to problems, formulation of problems.

Unit II:
Simplex Method: Concept of simplex Method, solving profit maximization and cost minimizations problems. Formulation of farms and non farm problems as linear programming models and solutions.

Unit III:
Extension of Linear Programming models: Variable resource and price programming, transportation problems, recursive programming, dynamic programming.

Unit IV:
Game Theory- Concepts of game theory, two person constant sum, zero sum game, saddle point, solution to mixed strategies, the rectangular game as Linear Programming.

Practical
Graphical and algebraic formulation of linear programming models. Solving of maximization and minimization problems by simplex method. Formulation of the simplex matrices for typical farm situations.

Suggested Readings:
- *Dorfman R. 1996. Linear Programming & Economic Analysis. McGraw Hill.*
- *Loomba NP. 2006 Linear Programming. Tata McGraw Hill*

AEC- 509: Research Methodology for Social Sciences   2(1+1)

Why this course:
Planning of research is very crucial to conduct a successful research. There is need to give an insight to the student about how to conduct a research, right from data collection to analysis and finally writing the references.

Objective of Course:
The course deals with scientific methods of research, the initiation of an inquiry, formulation of research problems and hypotheses, the role of induction and deduction in research, collection and analysis of date and interpretation of results

Theory
Unit I: Concepts of research methodology
Importance and scope of research in agricultural economics. Types of research – Fundamental vs. Applied. Concept of researchable problem – research prioritization – selection of research problem. Approach to research – research process.

Unit II: Hypothesis: Framing and Testing, Sampling
Hypothesis – meaning – characteristics – types of hypothesis – review of literature – setting of Course Objective and hypotheses – testing of hypothesis. Sampling theory and sampling design – sampling error - methods of sampling – probability and non-probability sampling methods -. Research design and techniques – Types of research design.

Unit III: Data Collection

Data collection – assessment of data needs – sources of data collection – discussion of different situations. Mailed questionnaire and interview schedule – structured, unstructured, open ended and closed-ended questions. Scaling Techniques. Preparation of schedule – problems in measurement of variables in agriculture. Interviewing techniques and field problems - methods of conducting survey – Reconnaissance survey and Pre testing.

Unit IV: Data Analysis

Data coding, tabulation, cleaning. –Multivariate analysis –factor analysis' PCA' cluster analysis. Universal procedures for preparation of bibliography – writing of research articles.

Practical
• Exercises in problem identification.
• Project proposals – contents and scope.
• Formulation of Objective and hypotheses.
• Assessment of data needs – sources of data – methods of collection of data.
• Methods of sampling – criteria to choose – discussion on sampling under different situations.
• Scaling Techniques – measurement of scales.
• Preparation of interview schedule.
• Field testing. Method of conducting survey.
• Exercise on coding, editing, tabulation and validation of data.
• Preparing for data entry into computer.
• Hypothesis testing – Parametric and Non-Parametric Tests.
• Exercises on format for Thesis/ Report writing.
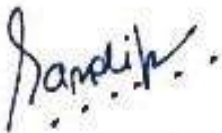• Presentation of the results.

Teaching Methods/ Activities:
• Lectures.
• Case studies.
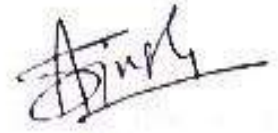• Assignments (Group/individual).
• Group Discussions

Suggested Readings:
• *Baker CB. Research Methodology in Agricultural Economics*
• *Cohen MR and Nagel R. An Introduction to Logic and Scientific Method*
• *Devey J Logic. The Theory of Enquiry*
• *Dhondhyal SP. Social Science Research and Thesis Writing*
• *Ezekiel M. Correlation Analysis*
• *Heady EO. Linear Programming Methods*
• *Willson ER. An Introduction to Scientific Research*
• *Kumar A. 2008. Research Methodology: A Survey. Alts, New Delhi,*
• *Modern Agricultural Economics(in Hindi), Rama Publishing House.*

Minor Course (Course contents)

AEC-510: Indian Economy: History and Contemporary Issues   2 (2+0)
Why this course:

India is a developing economy. The evolution of the Indian economy will enlighten the student with how an economy develops. Students will understand how the policies and measures taken shape up the economy of the country.

Objectives of course:

To introduce the students to the economic history over a period of time. It also highlights the contemporary issues of Indian economy.

Theory

Unit I: India from Independence to Liberalization

An overview of the economic developments during the period 1947-1980; Objectives and strategies of planned economic development and the role of the State; Sectoral growth performance; savings and investment; Demographic trends and issues; education; health and malnutrition; Trends and policies in poverty; inequality and unemployment.

Unit II: India Since 1980's (Liberalization And Beyond): Overview

Policy Changes since 1980s. The 1990 Crisis. Causes and Effects of liberalization. Regional differences: infrastructure, primary, secondary and tertiary sector.

Unit III: Macro Trends Since 1990

Growth; Savings and Investment, Employment; productivity; diversification; Agro based industries; competition policy; foreign investment, Regional differences.

Unit IV: Contemporary Issues

Monetary and Financial trends- areas of government spending in India, Capital expenditure, revenue expenditure, plan expenditure, non plan expenditure, Capital receipts, revenue receipts, tax and non tax revenue, direct and indirect taxes, need to rationalize tax structure. Goods and Services Tax (GST). Union Budget, Zero base budgeting, Gender budgeting, Fiscal devolution and centre state financial relations in India, WPI, CPI implicit deflators. Foreign Trade policy.

Teaching Methods/ Activities:
• Lectures
• Power point presentation by students on monetary and fiscal policy in past and present.
• Assignments (Group/individual).
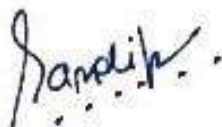• Group Discussions on Tax and its reforms.
Suggested Reading:
• *Dutt and Sundaram. Indian Economy*

AEC 511: International Economics   3 (2+1)

Why this course:

The era of Globalisation, liberalization and privatization has unified the whole world. There is trade across national boundaries and one economy has effect on the other. Getting familiar with national economy is not sufficient to understand the mechanism of trade and economic aspects. Thus, this course is designed to teach student about the trade as international level.

Objectives of course:

The major objective of this course is to give an insight of the interactions between national economies. What are the theories governing the trade across national boundaries. The methods involved to regulate the international trade and institutions involved.

Theory

Unit I: Concepts of International Economics

Scope and Significance of International Economics – The role of trade- General Equilibrium in a Closed Economy (Autarky Equilibrium) – Equilibrium in a Simple Open Economy - Possibility of World Trade - Trade gains and Trade Equilibrium.

Unit II: Barriers to trade

Tariff, Producer Subsidy, Export Subsidy, Import Quota and Export Voluntary Restraints- The Case of Small Country and Large Country Case.

Unit III: Models of trade

Ricardian Model of Trade- Specific Factors Model- Heckscher - Ohlin Model – Trade Creation and Trade Diversion – Offer Curve - Export Supply Elasticity and Import Demand Elasticity – Comparative Advantage and Absolute Advantage. Official Exchange Rate and Shadow Exchange Rate - Walra's Law and Terms of Trade – Trade Blocks.

Unit IV: Trades Institutions

IMF, World Bank, IDA, IFC, ADB – International Trade agreements – Uruguay Round – GATT – WTO.

Practical

• Producer's Surplus, Consumer's Surplus, National Welfare under Autarky and Free Trade Equilibrium with small and large country assumption.
• Estimation of Trade Gains
• Estimation of competitive and comparative measures like NPC, EPC, ERP and DRC
• Estimation of Offer Curve Elasticity
• Estimation of Effect of Tariff, Export Subsidy, Producer Subsidy, Import Quota and Export Voluntary Restraints on National Welfare
• Estimation of Ricardian Model
• Estimation of Effect of Trade under Specific Factor Model
• Estimation of trade Equilibrium under Heckscher -Ohlin model
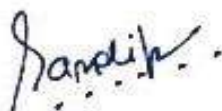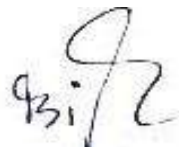
Teaching Methods/ Activities:

• Lectures.
• Case studies.
• Assignments (Group/individual).
• Power point presentation on International Trade in current scenario

Suggested Reading:
• *Kindelberger and Joshi PK. 2016. International Economics AITBS Delhi-110051*
• *Brouwer F. International Trade and Food Security. LEI - Wageningen UR, The Netherlands.*

AEC 513: Natural Resource and Environmental Economics   2(1+1)

Why this course:

Sustainable development is the need of the hour. The economic activities affect not only the society but also the environment. Every activity has its social cost. The students, hence will be taught about the economic aspect of environment.

Objectives of course:

To understand about economics of environment and social costs incurred due to economic development. Work out methods to maintain environment quality and reduce social costs

Theory

Unit I: Basic Foundation

Concepts, Classification and Problems of Natural Resource , Economy -Environment interaction – The Material Balance principle, Entropy law-Resources Scarcity - Limits to Growth - Measuring and mitigating natural resource scarcity – Malthusian and Recardian scarcity – scarcity indices - Resource Scarcity and Technical Change.

Unit II: Theories and economics of natural resources

Theory of optimal extraction renewable resources –economic models of oil extraction efficiency - time path of prices and extraction - Hotelling's rule, Solow-Harwick's Rule. Theory of optimal extraction exhaustible resources – economic models of forestry and fishery.

Unit III: Functioning of Market

Efficiency and markets – market failures - externalities – types - property rights – transaction costs – Coase's theorem and its critique - public goods – common property and open access resource management - Collective action.

Unit IV: Environmental Issues and regulations

Environmental perspectives - Environmental problems and quality of environment - Sources and types of pollution -air, water, solid waste, land degradation – environmental and economic impacts - Economics of pollution control . International Environmental Issues – climate change – likely impacts – mitigation efforts and international treaties . Environmental regulation – economic instruments - pollution charges – Pigovian tax - tradable permits – indirect instruments – environmental legislations in India.

Practical

• Exhaustible resource management – optimum rate of oil extraction.
• Renewable resource management – optimum harvest of Forestry/fishery.
• Exercise on pollution abatement-I.
• Exercise on pollution abatement-II.
• Concepts in valuing the environment.
• Productivity change method – substitute cost method – Hedonic price method –
  Travel cost method – Contingent valuation methods.
• Discount rate in natural resource management.
• Environment impact assessment
• Visit to Pollution Control Board.

Teaching Methods/ Activities:

• Lectures.
• Case studies.
• Assignments (Group/individual).

Suggested Reading:

• Pearce DW and Turner RK. *Economics of Natural Resource and Environment*
• Kwak J. *Economism: Bad Economics and the Rise of Inequality*
• Tietenberg T and Lewis L. *Environmental and Natural Resource Economics*
• Schwarz PM. *Energy Economics*

AEC 516: Rural Marketing   2 (2+0)

Why this course:

This course is designed with an objective to deliver knowledge of the rural techniques of farmers to sell of their produce, commodity sell promotion, problems and policies agricultural commodities.

Objectives of course:

To explore the possibilities and potential of the rural market. It aims at critically analysing the market opportunities, consumer trends and patterns and development of better marketing strategies for the rural areas.

Theory

Unit I: Rural Marketing Environment

Rural Market Concept & Scope: Concept, Definition and Scope of rural marketing, nature and characteristics of rural markets, rural V/S urban market. Environmental factors: Socio-cultural, economic, demographic, and technological and other environmental factors affecting rural marketing.

Unit II: Rural finance and consumer's behavior

Rural finance: Concept, demand, banking model; Finance Schemes of NABARD, Other Schemes of State Govt, Central Govt., Rural consumer's behavior: Behavior of rural consumers and farmers; buyer characteristics and buying behavior; customer relationship management.

Unit III: Rural Marketing Strategy

Rural Product strategy: Marketing of consumer durable and non-durable goods and services in the rural markets with special reference to product planning; marketing mix, product mix.

Unit IV: **Pricing and Communication strategy**

Pricing for rural markets: Pricing policy and pricing strategy, distribution strategy, Rural retailing and modern store formats in rural areas. Promotion and communication strategy: Media Planning, Distribution channels, personal selling strategies in rural markets.

Teaching methods/activities

• Lectures
• Discussion
• Case Studies
• Student-led presentations

Suggested Reading

• Krishnamacharyulu and Ramakrishnan. 2010. *Rural Marketing: Text and Cases*: Pearson Education. 2nd edition
• Singh S. 2004. *Rural Marketing: Focus on Agricultural Inputs,* Vikas Publishing
• Kashyap P. 2011. *Rural Marketing*. Pearson Education
• Kumar D and Gupta P. 2017. *Rural Marketing: Challenges andOpportunities*. Sage Publications.

Supporting Course (Course contents)

STAT 501: Statistical Methods for Applied /Social Sciences   3(2+1)
Objective of the course:

This course is meant for students who do not have sufficient background of Statistical. Statistical Sciences: Agricultural Statistics. The students would be exposed to concepts of statistical methods and statistical inference that would help them in understanding the importance of statistics. It would also help them in understanding the concepts involved in data presentation, analysis and interpretation. The students would get an exposure to presentation of data, probability distributions, parameter estimation, tests of significance, regression and multivariate analytical techniques.

Theory
Unit I:

Box-plot, Descriptive statistics, Exploratory data analysis, Theory of probability, Random variable and mathematical expectation.

Unit II:

Discrete and continuous probability distributions, Binomial, Poisson, Negative Binomial, Normal distribution and their applications. Concept of sampling distribution: chi-square, t and F distributions. Tests of significance based on Normal, chi-square, t and F distributions.

Unit III:

Introduction to theory of estimation and confidence-intervals, Simple and multiple correlation coefficient, partial correlation, rank correlation, Simple and multiple linear regression model, test of significance of correlation coefficient and regression coefficients, Coefficient of determination.

Unit IV:

Non-parametric tests – sign, Wilcoxon, Mann-Whitney U-test. Median test. Introduction to ANOVA: One way and Two Way, Introduction to Sampling Techniques, Introduction to Multivariate Analysis, Transformation of Data.

Practical:
• Exploratory data analysis, fitting of distributions ~ Binomial, Poisson, Negative
• Binomial, Normal.
• Large sample tests, testing of hypothesis based on exact sampling distributions ~chi square, t and F.
• Confidence interval estimation and Correlation and regression analysis, fitting of Linear and Quadratic Model.
• Non-parametric tests. ANOVA: One way, Two Way, SRS.

Suggested Reading:
• *Goon, A.M., Gupta, M.K and Dasgupta, B. (1977). An Outline of Statistical Theory. Vol. I. The World Press.*
• *Goon, A.M., Gupta, M.K. and Dasgupta, B. (1983). Fundamentals of Statistics. Vol. I. The World Press.*
• *Hogg, R.V. and Craig, T.T. (1978). Introduction to Mathematical Statistics. Macmillan.*
• *Morrison, D.F. (1976). Multivariate Statistical Methods. McGraw Hill.*
• *Hogg, R.V., McKean, J.W., Craig, A.T. (2012). Introduction to Mathematical Statistics 7th Edition.*
• *Anderson, T.W. (2009). An Introduction to Multivariate Statistical Analysis, 3rd Ed . John Wiley Restructured and Revised Syllabi of Post-graduate Programmes Vol. 2*
• *http://freestatistics.altervista.org/en/learning.php.*
• *http://www.statsoft.com/textbook/stathome.html.*

STAT/COMP: Computer Applications for Agri Business & Economics 3 (2+1)

Objectives of course:

The course aims to instill the significance of computer applications in the organizations and handling recent trends in information technology and system for improved decision making

Theory
Unit I:

Concept of Computers- Brief History of Computers, Generation and Its Evolution, Characteristics of Computers, Main Areas of Computers and their Applications; Classification of Computers, Input-Output Devices, Memory Types (Cache, RAM, ROM), Memory Units,

Unit-II:

System Software and Application Software, Open source software, introduction to computer languages, Introduction to Operating Systems – Functions, Features and Types., MS Windows and LINUX. Data Base Management System, MS Office (MS Word, MS Power Point, MS Excel, MS-Access and use of various management software Like SPSS, SAS etc.

Unit III:

The business value of internet, Intranet, extranet and Internet, Introduction to Web page design using HTML, Cloud Computing, Security and ethical challenges: Computer crime – Hacking, cyber theft, unauthorized use at work. Piracy – software and intellectual property. Health and Social Issues, Ergonomics and cyber terrorism.

Unit IV:

e-business/ e-commerce: e-business models, e-commerce processes, electronic payment systems, e-commerce trends with special reference to agri business. Applications of MIS in the areas of Human Resource Management, Financial Management, Production/Operations Management, Materials Management, Marketing Management.

Practical:

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS- EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data. MSACCESS: Creating Database, preparing queries and reports, demonstration of Agri information system. Introduction to World Wide Web (www). Introduction of programming languages. Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/Crop Syst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools, Practice and commands of DOS. Use of Ms Office.

Teaching methods/activities:

• Lectures
• Practicals
• Live project
• Assignments
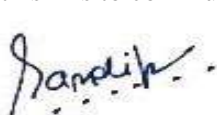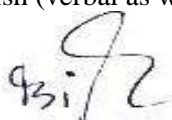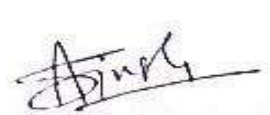• Presentations

Suggested Reading:

• *Laudon KC and Laudon JP. 2016. Management Information Systems- Managingthe digital*
• *Firm, 14h Edition, Pearson India*
• *Turban, Volonino, Woods. Wali OP. 2015. Information Technology for Management,*
• *Advancing Sustainable, Profitable Business Growth, Wiley*
• *Jaiswal M and Mittal M. 2005. Management Information System, Oxford*

Common Course (Course contents)

COMN. 501: Technical Writing and Communications Skills   (0+1)

Objectives of course:

To equip the students/ scholars with skills to write dissertations, research papers, etc. To equip the students/ scholars with skills to communicate and articulate in English (verbal as well as writing).

Practical (Technical Writing)
• Various forms of scientific writings- theses, technical papers, reviews, manuals, etc.;
• Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion);
• Writing of abstracts, summaries, précis, citations, etc.; Course Code Course Title Credit Hours xiii Common Academic Regulations for PG and Ph.D. Programmes
• Commonly used abbreviations in the theses and research communications;
• Illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations;
• Writing of numbers and dates in scientific write-ups;
• Editing and proof-reading;
• Writing of a review article;
• Communication Skills - Grammar (Tenses, parts of speech, clauses, punctuation marks);
• Error analysis (Common errors), Concord, Collocation, Phonetic symbols and transcription;
• Accentual pattern: Weak forms in connected speech;
• Participation in group discussion;
• Facing an interview;
• Presentation of scientific papers.

Suggested Readings:
• *Barnes and Noble. Robert, C. (Ed.). (2005). Spoken English: Flourish Your Language.*
• *Chicago Manual of Style. 14th Ed. (1996). Prentice Hall of India.*
• *Collins' Cobuild English Dictionary. (1995).*
• *Harper Collins. Gordon HM and Walter J.A. (1970). Technical Writing. 3rd Ed.*
• *Mohan, K. (2005). Speaking English Effectively. MacMillan India.*
• *Richard W.S. (1969). Technical Writing.*
• *Sethi, J. and Dhamija, P.V. (2004). Course in Phonetics and Spoken English. 2nd Ed. Prentice Hall of India.*

COMN. 502: Intellectual Property and its management in Agriculture (2+0)
Objectives of course:
The main objective of this course is to equip students and stakeholders with knowledge of Intellectual Property Rights (IPR) related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge based economy.
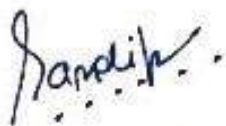
Theory
Unit I:
Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs;

Unit-II:
Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks.

Unit III:
Protection of plant varieties and farmers' rights and biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection.

Unit IV:

National Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

Suggested Readings:

- *Ganguli, P. (2001). Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill.*
- *Intellectual Property Rights: Key to New Wealth Generation. (2001). NRDC and Aesthetic Technologies.*
- *Ministry of Agriculture, Government of India. (2004). State of Indian Farmer. Vol. V. Technology Generation and IPR Issues. Academic Foundation.*
- *Rothschild, M. and Scott, N. (Ed.). (2003). Intellectual Property Rights in Animal Breeding and Genetics. CABI.*
- *Saha, R. (Ed.). (2006). Intellectual Property Rights in NAM and Other Developing Countries: A Compendium on Law and Policies. Daya Publ. House.*

COMN. 503:Agricultural Research, Research Ethics and Rural Development Programmes   2(2+0)

Objectives of course:

To enlighten the students about the organization and functioning of agricultural research systems at national and international levels, research ethics, and rural development programmes and policies of Government.

Theory

Unit I:

History of agriculture in brief; Global agricultural research system: need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels.

Unit II:

Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

Unit III :

Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/ Non-Governmental Organisations.

Unit IV:

Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

Suggested Readings

- *Bhalla, G.S. and Singh, G. (200). Indian Agriculture - Four Decades of Development. Sage Publ.*

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Member BOS

(I.P. Singh)
Dean

Dr. (Ajit Kr. Singh)
Convener, B.O.S.

- *Punia, M.S. Manual on International Research and Research Ethics.CCS Haryana Agricultural University, HisarRao, B.S.V. (2007). Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives. Mittal Publ.*
- *Singh, K. (1998). Rural Development - Principles, Policies and Management. Sage Publ.*

DEPARTMENT OF AGRICULTURAL ECONOMICS
List of Journals
- Agricultural Economics Research Review
- Agricultural Finance Review
- Agricultural Marketing
- Agriculture and Agro-industries Journal
- Agricultural Situation in India
- Agriculture Statistics at a Glance
- APEDA Trade yearbook
- Asian Economic and Social Review (Old Series)
- Bulletin of Agricultural Prices
- Economic and Political Weekly
- Economic Survey of Asia and Far East
- FAO Commodity Review and Outlook
- FAO Production Year book
- FAO Trade year book
- Indian Cooperative Review
- Indian Economic Journal
- Indian Journal of Agricultural Economics
- Indian Journal of Agricultural Marketing
- Indian Journal of Economics
- International Food Policy Research Institute Research Report
- Journal of Agricultural Development and Policy
- Journal of Agricultural Economics
- Journal of Agricultural Economics and Development
- Journal of Farm Economics
- Land Economics
- Productivity
- Reserve Bank of India Bulletin
- Rural Economics and Management
- World Agricultural Economics and Rural Sociology Abstracts
- World Agricultural Production and Trade: Statistical Report
- Yojana

e-Resources
- www.pearsoned.com (Pearson Education Publication)
- www.mcgraw-hill.com (McGraw-Hill Publishing Company)
- www.oup.com (Oxford University Press)
- www.emeraldinsight.com (Emerald Group Publishing)
- www.sagepub.com (Sage publications)
- www.isaeindia.org (Indian Society of Agricultural Economics)
- www.macmillanindia.com (Macmillan Publishing)
- www.icar.org.in (Indian Council of Agricultural Research)
- www.khoj.com (Directory for Agricultural Economics)
- www.ncap.res.in (National Centre for Agricultural Economics and Policy Research)
- www.ncdex.com (National Commodity & Derivatives Exchange Limited)
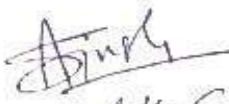- www.phdcci.in (PHD Chamber of Commerce and Industry)

- www.ficci.com (Federation of Indian Chambers of Commerce and Industry)
- www.assocham.org (Associated Chambers of Commerce and Industry of India)
- www.apeda.com (Agricultural and Processed Food Products Export Development Authority)
- www.mpeda.com (Marine Products Export Development Authority)

Suggested Broad Topics for Master's Research

o Economics of Irrigation water in different agro-climatic conditions
o Potential of exports of agri-products
o Potential domestic as well as international markets for value added agri-products
o Demand & supply gap of different agri-products and agri-inputs
o Economic analysis of new agri-technologies
o Input use efficiency in different agro-climatic conditions
o Income and expenditure pattern in rural areas
o Saving and investment pattern in rural areas
o Return from investment in agriculture research
o Marketing of agri-products in WTO regime
o Impact of WTO on agricultural economy
o Impact of Agricultural credit on socio-economic condition of the farmers
o Optimization of production process to reduce the cost of production
o Economic analysis of diversification, processing and value addition in agriculture sector
o Emerging international marketing scenario of agri-products
o Extent of farmers' indebtedness in different agro-climatic conditions

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